The Financial Social Accounting Matrix for China, 2002, and Its Application to a Multiplier Analysis

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Abstract

This study aims to shed light on the linkage between real side and financial side of Chinese economy. Utilizing a financial social accounting matrix (F-SAM) for China, 2002, newly constructed for this purpose, the current study provides a consistent accounting system for Chinese economy. The F-SAM allows a close examination on the structural characteristics of Chinese economy from the perspective of flows of funds. The study goes further to multiplier analysis. The main findings are: first, real side and financial side of Chinese economy are intertwined with each other; secondly, the development of a modern financial system contributes to the growth of Chinese economy; thirdly, financial sector, in place of government, has come to play a central role in resource mobilization and allocation, although government maintains interventions through capital transfer to non-financial enterprises; fourthly, bank deposits and loans are single significant financial instruments in China's resources mobilization and allocation processes.

1. Introduction

After 1978, together with the transition from a centrally planned economy to a market-oriented economy, China has made fundamental changes in its financial system. It is therefore of the interest to examine the features of current financial system of China. Especially, given the development of a modern financial system in China, we are interested in: (1) how financial capital flows among various institutions of Chinese economy; (2) to what extent, in resource mobilization and allocation, the financial system has replaced the role of fiscal system in China.

The changes in China's financial system can be reviewed from three perspectives, namely, saving structure, investment structure and financial intermediation.[1] First, reforms after 1978 have resulted in the separation of main saver and investor. Public sector is not the main saver and investor in Chinese economy any more. As presented in Table 1, with respect to the saving structure, households replaced the state to become the main source of savings in Chinese economy. In 1978, household savings comprised only 23.0 percent of gross domestic savings, while the savings by government and

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enterprise sector[2] accounted for 77 percent. In 2002, household savings accounted for 46.4 percent of gross domestic savings, while the government savings stood for 18.0 percent. With respect to the investment structure, obviously the role played by the state in total investment has weakened as well. The percentage of the investment by state-owned units in total fixed assets investment decreased sharply from 81.9 percent in 1980 to 33.4 percent in 2005.

Table 1 Changes in Saving and Investment Structures, China, Selected Years (%)

Gross Domestic Savings	1978	1985	1987	1992	1995	2000	2002	
Households	23.0	37.2	41.4	52.3	48.2	42.8	46.4	
Enterprises	34.0	43.3	47.3	33.1	40.1	40.6	35.6	
Government	43.0	19.5	11.4	14.6	11.7	16.5	18.0	
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
Total Investment in Fixed Assets	1980	1985	1987	1992	1995	2000	2002	2005
State-owned Units	81.9	66.1	64.6	68.1	54.4	50.1	43.4	33.4
Collective Units	5.0	12.9	14.4	16.8	16.4	14.6	13.8	13.5
Individuals	13.1	21.0	21.0	15.1	12.8	14.3	15.0	15.6
Other Types					16.3	21.0	27.9	37.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Notes: 1. Regarding the gross domestic savings, data for year 1978 refer to Wei (2000: 28), data for year 1985 and 1987 refer to World Bank (1990: 143), data after 1992 are calculated by the author.

2. Other types of investment in fixed assets refer to the joint ownership units, share holding units, foreign-funded units (including the investment units from Hong Kong, Macao and Taiwan, China) and other types of ownership.

Sources: World Bank (1990: 143), Wei (2000: 28) and author's calculations from flow-of-funds tables and China Statistical Yearbook, various issues.

Secondly, the changes in saving and investment structures have accompanied the strong impetus to improve China's financial intermediation. Table 2 shows the changes in the composition of financial assets after 1978. It shows that the share of long-term securities including various bonds and stocks have increased substantially during the reform period although bank deposits and lendings still represent the vast majority of financial assets in China. The emergence of new financial instruments permits the diversification of, first, asset portfolios of savers; second, financing channels for investors.[3]

Against this backdrop, China's savings behavior and financial intermediation have drawn the attentions of many economists. Several studies including Qian (1988), Jefferson (1990), Wang (1995), Modigliani and Cao (1996), Kraay (2000) empirically tested alternative theories of savings for China.[4] Meanwhile, studies including Park and Sehrt (2001), Aziz and Duenwald (2002), Boyreau-Debray (2003) and most recently, Hao (2006), Liang and Teng (2006), were devoted to examining the relationship between China's financial intermediation and economic growth. However, none of the aforementioned studies addressed the financial issues in China from the perspective of inter-sectoral financial flows. The blank is largely due to the lack of systematic flow-of-funds data. Note that *China*

Table 2 Changes in Composition of Financial Assets, China, Selected Years (%)

	1978	1986	1991	1995	2000	2004
Currency in circulation	6.4	7.6	6.8	6.0	4.5	3.7
Total Deposits in Financial Institutions	35.0	36.4	38.5	40.8	38.0	41.9
1. Household Deposits	6.4	14.0	19.4	22.5	19.7	20.8
2. Enterprise & Institution Deposits	16.0	20.4	15.0	13.0	14.2	16.1
3. Treasury Deposits	5.7	1.9	1.0	0.7	1.1	1.1
4. Other Deposits	6.9	0.2	3.0	4.6	3.0	4.0
Total loans in Financial Institutions	57.2	50.6	44.7	38.2	30.5	31.0
Government Borrowing	—	2.3	2.3	1.2	0.5	—
Bonds, Stocks & Insurance	0.5	2.8	4.8	8.7	22.0	14.6
1. Bonds	—	2.5	3.4	4.9	6.8	7.5
2. Stocks	—	—	1.0	3.4	14.7	6.4
3. Domestic Insurance Premium	0.5	0.3	0.4	0.3	0.5	0.8
Foreign Assets (Net Value)	1.0	0.2	2.9	5.1	4.7	8.8
Total Financial Assets	100.0	100.0	100.0	100.0	100.0	100.0

Notes: 1. Data for year 2004 is supplemented by the author.
2. Following Wei (2000: 96) and Yi (1996: 27), stocks refer to the data of total market capitalization. In Zhou (2004: 44–45), it referred to the data of capital raised through stocks issuance.

Sources: Zhou (2004: 44–45), Wei (2000: 96), Yi (1996: 27) and author's calculations from *China Statistical Yearbook*, *Almanac of China's Finance and Banking*, various years.

Statistical Yearbook started to disclose flow-of-funds statistics (annual flow tables) since 1998. The statistics date back to 1992. While, the detailed tables with more financial instruments are only available for the period 1998–2002.[5] Recently, Kujis (2005 and 2006) made the first attempt to examine the inter-sectoral financial flows using these newly published flow-of-funds statistics. He found that, first, although gross household savings is high in China, compared to other countries, much of the savings are due to unusually high gross enterprise and government savings; second, much of China's savings and investment can not be explained by the set of determinants suggested in the literature; third, although current levels of savings and investment may not decline drastically in the near future, the potential effects of government policy adjustments on savings, investment and saving-investment balance are presumably large.

Following Kujis (2005 and 2006), this study, also using flow-of-funds statistics, contributes to the literature in an attempt to link the saving-investment discussion to, first, financial flows among institutions; second, production activities in the real economy, through which the study aims to shed light on the linkage between financial side and real side of current Chinese economy. In addressing the issue, we construct a financial social accounting matrix (hereafter, F-SAM) for China, 2002. To the best of our knowledge, this study is the first F-SAM analysis for China. The remainder of the paper is organized as follows. Section 2 presents the F-SAM for China, 2002. The framework and data to

construct the F-SAM are also explained in the section. Section 3 examines the features of China's financial structure based on the evidence from F-SAM. Section 4 explains the framework of F-SAM multiplier analysis and examines the results. Finally, section 5 provides the concluding remarks.

2. The F-SAM for China, 2002

2.1 Literature Review

Integrating the real and financial sides of economy has long been an issue of economists. As mentioned by Cohen (1968: 1), "while the post-Keynesian era has witnessed remarkable strides in both expenditure and financial theory, equally satisfactory work in the interstices of this research has not kept pace". The compilation of flow-of-funds statistics[6], to a great extent, ameliorates the situation by providing a dataset which links the financial flows (measured as changes of financial assets in both asset- and liability-sides) to saving and investment behaviors of economic units.

The literature which attempts to bring the flow-of-funds statistics into quantitative economic model-building can be largely classified into two groups. The first group applies the econometric techniques to construct the "flow-of-funds models". The pioneering studies in this group include Dawson (1958), Tobin (1969) and Cohen (1963 and 1968). This group of studies, afterwards, extended to the financial computable general equilibrium models with flow-of-funds as a part of them. In contrast, the second group applies the matrix techniques. This group of studies can be further classified into two sub-groups.

One sub-group directly manipulates the flow-of-funds statistics. Stone (1966) and Klein (1983 and 2003)[7], two pioneers in this sub-group, proposed the methods to convert the balance-sheets of flow-of-funds accounts into a square matrix. Consequently, techniques widely used in input-output analysis can be applied to flow-of-funds statistics. Their models, later on, were empirically applied by Tsujimura and Mizoshita (2002a, 2002b, 2003, and 2004) and Nishiyama (1989 and 1992) respectively to Japanese economy.

Another sub-group expands to construct F-SAM which integrates flow-of-funds within SAM framework.[8] Roe (1985) pioneered the studies by suggesting an approach to disaggregate capital account and financial claims. He argued that, the elaborations would contribute to the understanding of the role of financial system in economic development. Afterwards, Robinson (1991) provided a schematic framework of practical use for the construction of F-SAM. Following him, Emini and Fofack (2004) and Waheed and Ezaki (2006 and 2007) conducted multiplier analyses after constructing F-SAMs for Cameroon and Pakistan, respectively. Recently, Blancas (2006) conducted a similar study for Mexico. However, his approach to construct F-SAM was slightly different from Roe (1985) and Robinson (1991).[9] In this study, we will follow this sub-group of studies because the linkage between financial and real sides of Chinese economy is more of our interest.

2.2 F-SAM: A Conceptual Framework

In this study, F-SAM is constructed following the approach proposed by Robinson (1991). The main feature of this F-SAM is in its specification of the loanable funds market with a variety of financial assets. Figure 1 illustrates the circular income flows in the scheme of F-SAM. The differences between F-SAM and traditional real SAM are highlighted in the right-below corner of the figure enclosed by dotted line. First, F-SAM has a disaggregated capital account consisting of various economic institutions. Secondly, F-SAM has a financial account which depicts the changes in balance-sheets of economic institutions for a certain time period, usually one year. Flow-of-funds statistics (flow table), therefore, enter the F-SAM as two matrices with one standing for the changes in financial assets, another one standing for the changes in financial liabilities. Apparently, financial flows exert impacts on the economy through both-way interactions with capital accounts of institutions.

It is worthy to note that real-financial linkage in the economy is traceable through the interactions of saving-investment balances of institutions in the F-SAM framework. For each economic institution and also for the whole economy, the identity

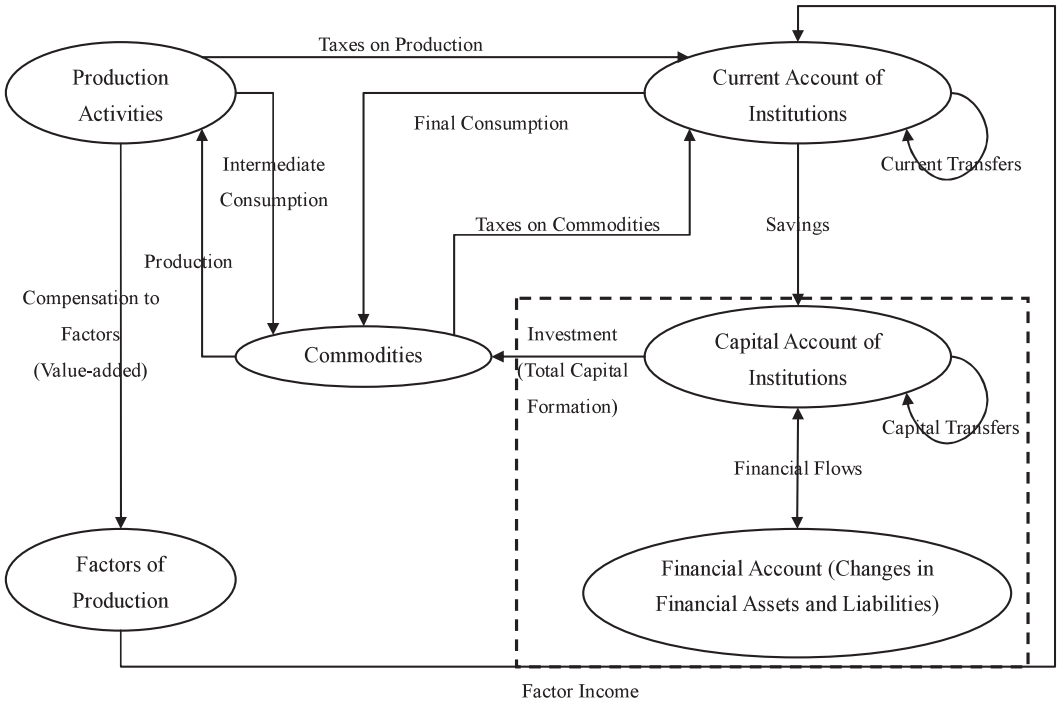
$$\text{Saving} - \text{Investment} = \Delta\ \text{Financial Assets} - \Delta\ \text{Financial Liabilities}$$

always holds. Institutions with saving-investment surplus thereby accumulate (net) financial assets and finance the deficit of other institutions and vice versa. Put explicitly, economic institutions make the decisions of spending to allocate their income with the remaining part going to savings. Savings of institutions, recorded as the transfers from current accounts to capital accounts in the F-SAM, consequently would be channeled to investment, i.e., accumulation of physical capital.[10] The part of investment of an institution which can not be financed through its own savings would be mobilized through financial instruments. Consequently, financial flows enter the F-SAM framework to accommodate saving-investment balances distinguished between current accounts and capital accounts of various institutions. In addition, the spending decisions and the portfolio decisions of economic institutions, i.e., real side and financial side of the economy, must be mutually consistent in the equilibrium state.

2.3 Construction of the F-SAM for China, 2002

As mentioned above, the structure of F-SAM used in this study closely follows the approach of Robinson (1991). Previous study by Santos (2005) for Portugal is also used as reference to construct the F-SAM. The schematic framework of F-SAM is described in Appendix 1. Current F-SAM consists of five main accounts, namely, production activity accounts (7 production activities, i.e., agriculture, mining & quarrying, light industry, energy industry, heavy industry, construction, and services), factor accounts (two factors of production, i.e., labor and capital), current accounts of institutions, capital accounts of institutions (five institutions, i.e., households, government, non-financial enterprises, financial institutions, and rest of the world) and financial accounts (9 financial instruments, i.e.,

Figure 1 Economy-wide Circular Flows of Income in the F-SAM Framework



Note: Arrows in the figure show the directions of income flows.
Source: Author's construction.

currency in circulation, deposits, government bonds, corporate bonds, stocks, loans, FDI, foreign reserves and other financial flows).

The data to construct the F-SAM, China, 2002, all come from officially published sources including input-output table, flow-of-funds table and balance of payment table. Input-output table, 2002 can be found in *China Statistical Yearbook*, 2006. Detailed flow-of-funds table is available in *Data of Flow-of-Funds of China,* 1978–2002. Balance of payment table, 2002 is available in *China Statistical Yearbook*, 2003. The average exchange rate for 2002, i.e., RMB 8.277 yuan per USD, is used in calculation to convert the USD values of balance of payment data into Chinese yuan. The final F-SAM which we constructed is a matrix of 28 rows by 28 columns. In the F-SAM, rows and columns 1–14 refer to the real side of the economy, and rows and columns 15–30 refer to the financial side of the economy. Appendix 2 presents the F-SAM for China, 2002.[11]

Note that our final F-SAM has an aggregated financial sector including both central bank and other financial institutions. This non-separation is due to the data limitation. However, the financial assets/liabilities of central bank and other financial institutions will not be netted out in final F-SAM because current F-SAM framework incorporates flow-of-funds statistics directly as financial liability matrix and financial asset matrix. Flow-of-funds statistics are constructed following the principle of

double-entry book-keeping. The changes in both asset-side and liability-side are therefore recorded in the F-SAM. Meanwhile, this non-separation does cause the problem in examining the impacts of monetary policies because the credit creation process is not traceable in current framework. Similarly, in the real sector, public-private relationships are somewhat mixed up as well because the sector of non-financial enterprises includes state-owned enterprises. This non-separation is also due to the data limitation. Consequently, with current F-SAM, it is not possible to compare the financial flows from financial sector respectively to state-owned and private enterprises and their impacts on the economy.

3. China's Financial Structure—Evidence from the F-SAM, 2002

We now examine the features of China's financial structure from the perspective of capital (both physical and financial) mobilization and utilization of sectors.[12] An overview of the sectoral saving and investment is provided in Table 3, which is summarized from the F-SAM. We conduct the analysis by examining the table while referring to the original F-SAM if necessary. Note that all numbers with an asterisk, *, refer to Appendix 2 while others without asterisks are directly available in Table 3. On the liability side, total capital mobilization of each institution comprises of its savings (internal finance) and incurrence of financial liabilities (capital mobilization from other institutions, i.e., external finance). On the asset side, an institution can hold its assets in the form of either physical or financial assets, consequently utilized by other institutions. Obviously, with our F-SAM, it is easy to link the saving-investment balance (real side of the economy) to the changes in financial assets and liabilities (financial side of the economy). After a close examination of the F-SAM, we find it of interests in following five aspects.

First, household sector, as the largest surplus sector in the economy, accounted for 46.3 percent of total savings, and ran a saving-investment surplus of RMB 1464.7 billion (2136.6−671.9) in 2002. In the year, household sector borrowed RMB 507.4 billion from banking sector, and held 83.0 percent (131.9*/158.9*) of currency in circulation, 50.7 percent (1425.2*/2810.4*) of deposits in Chinese economy. In addition, household sector also held 66.1 percent (63.6*/96.2*) of the stocks, and 12.4 percent (46.3*/372.7*) of the government bonds issued in 2002. Household sector, therefore, held vast majority of its newly increased assets, 74.6 percent, in financial instruments in 2002, although largely in savings deposit.

Secondly, non-financial enterprise sector, the largest deficit sector and investor in the economy, ran a saving-investment deficit by RMB 1608.4 billion (1843.8−3452.2), and accounted for 74.8 percent of total capital formation in 2002. In order to finance its investment demand, non-financial enterprises mobilized RMB 2064.7 billion through financial system, of which 70.2 percent (1448.6*/2064.7) in bank loans. In addition, FDI to non-financial enterprises accounted for 19.8 percent (408.1*/2064.7) of its capital mobilization by financial instruments.

Table 3 Sectoral Financing Patterns, China, 2002 (Unit: bn. Yuan, %)

(a) Capital Mobilization

Institutions	Savings		Capital Transfer	Changes in Financial Liabilities		Total Capital Mobilization
	Value	% of Total Savings		Value	% of Total Capital Mobilization	
Households	2136.6	46.3		507.4	19.2	2644.0
Non-Financial Enterpriess	1843.8	39.9	563.4	2064.7	46.2	4471.9
Government	859.2	18.6		479.6	35.8	1338.8
Financial Institutions	69.8	1.5		3563.8	98.1	3633.6
Rest of World	−292.8	−6.3		771.4	161.2	478.6
Total	4616.6	100.0	563.4	7386.9		12566.9

(b) Capital Utilization

Institutions	Physical Investment		Capital Transfer	Changes in Financial Assets		Total Capital Utilization
	Value	% of Total Investment		Value	% of Total Capital Utilization	
Households	671.9	14.6		1972.1	74.6	2644.0
Non-Financial Enterpriess	3452.2	74.8	563.4	1019.7	22.8	4471.9
Government	471.0	10.2		304.4	22.7	1338.8
Financial Institutions	21.5	0.5		3612.1	99.4	3633.6
Rest of World	0.0	0.0		478.6	100.0	478.6
Total	4616.6	100.0	563.4	7386.9		12566.9

Sources: Author's calculations from F-SAM for China, 2002.

One feature which distinguishes China from other countries is the huge capital transfer, i.e., free capital financing, from government sector to non-financial enterprises.[13] It amounted to RMB 563.4 billion in 2002, which was equivalent to 12.6 percent (563.4/4471.9) of total capital mobilization and 21.4 percent (563.4/(563.4+2064.7)) of external finance of non-financial enterprises in the year. It is worthy to note that before the transfer, Chinese government actually ran a significant saving-investment surplus of RMB 388.2 billion (859.2−471.0). The fact implies that government is still powerful in resource allocation in China although the investment directly conducted by the government sector is not especially high. However, regarding the capital transfer to non-financial enterprises, current Chinese statistics do not provide any explanation for the format how the transfer is executed. Certainly, the capital transfer does not refer to the subsidies to state-owned enterprises because: (1) the subsidies would be counted as current transfer; (2) the statistics shows that the amount of subsidies is much smaller than the amount of capital transfer.[14] According to Kujis (2005 and 2006), this capital transfer goes to the state-owned enterprises in the power, electricity, water supply, transport and other infrastructure sectors. Therefore, the capital transfer is presumably to be the direct payment from government to non-financial enterprises, most possibly, large-scale state-owned enterprises for physical investment.[15]

Thirdly, government sector turned into deficit by RMB 175.2 billion (859.2-(471.0＋563.4)) due to its capital transfer payment to non-financial enterprises. In 2002, government sector held 95.2 percent (289.8*/304.4) of its newly increased financial assets in the form of fiscal deposits, while incurred 77.7 percent (372.7*/479.6) of financial liabilities in government bonds.

Fourthly, financial sector is active in financial intermediation to facilitate the capital flowing from household sector to non-financial enterprise sector. Furthermore, Chinese financial system is characterized by indirect finance. Since financial system mainly plays the role of intermediary in the economy, its own sector savings (1.5 percent of total domestic savings) and investment (0.5 percent of total capital formation) are extremely low. However, the amount of money flows through financial system is much larger than those of other sectors. Financial system, in 2002, mobilized RMB 3563.8 billion by issuing various financial instruments, of which 78.3 percent (2791.2*/3563.8) through bank deposits. In contrast, 99.4 percent of its total capital utilization was by the acquisition of financial assets, of which 56.1 percent (2025.9*/3612.1) by bank loans, 17.3 percent (625.0*/3612.1) by foreign reserves, and 9.0 percent (325.0*/3612.1) by government bonds.

Fifthly, rest of the world sector does not make physical investment by definition in F-SAM framework. It hence takes zero in total capital formation. The negative entries in savings suggest that there was net capital outflow from China to abroad, amounting to 6.3 percent of total domestic savings in 2002, despite the large amount of FDI inflow by RMB 408.1* billion in the year.

4. F-SAM Multiplier Analyses

In this section, we turn to F-SAM multiplier analyses. Two analytical approaches providing complementary findings are applied in the section. Note that two approaches do not have structural differences. The only difference between two approaches is in the partition of exogenous and endogenous accounts. The conventional approach considers the production activities, production factors, current accounts of institutions (enterprises and households) as endogenous accounts. While, in Waheed and Ezaki-approach, they are regarded as exogenous accounts.

We begin with an overview of the SAM multiplier model in 4.1. 4.2 provides an analysis based on a conventional approach. In the sub-section, F-SAM multiplier matrix is computed and compared with the real SAM multiplier matrix. The conventional approach allows us to examine the economy-wide impacts on income flows induced by exogenous shocks. Especially, the conventional approach has the advantage to assess the impacts of financial intermediation on production stimulation. In contrast, sub-section 4.3 applies an alternative approach proposed by Waheed and Ezaki (2007). The approach allows us to examine the changes in portfolio decisions of each institution induced by exogenous changes in institutional savings and investment. The Waheed and Ezaki-approach hence has the advantage to take a closer look at the role of financial system in resources mobilization and allocation.

4.1 Model Specification

F-SAM multiplier model is, technically, no more than the application of real SAM multiplier model to F-SAMs with the obvious difference that F-SAM framework contains more variables and relationships. We hence present a general framework of SAM (regardless of real SAM or F-SAM) multiplier model (see Table 4).

Apparently, if we assume that there exists excess capacity in the economy which would allow prices and expenditure propensities of endogenous accounts to remain constant, we can convert the SAM into an economy-wide computable model by following two steps: (1) partition all the accounts into endogenous accounts and exogenous accounts, and rearrange the SAM; (2) divide the each cell entry in the transaction matrix of endogenous accounts by its corresponding column sum to obtain a matrix of average expenditure propensities[16], exactly, matrix $\mathbf{A}_e$ in Table 4. The endogenous income $\mathbf{y}_e$ is consequently given by:

$$\mathbf{y}_e=\mathbf{A}_e\mathbf{y}_e+\mathbf{x}=(\mathbf{I}-\mathbf{A}_e)^{-1}\mathbf{x} \quad (1)$$

where $(\mathbf{I}-\mathbf{A}_e)^{-1}$, i.e., matrix of accounting multipliers, provides the linkage between exogenous and endogenous accounts. The SAM multiplier model therefore provides a framework, in which the impacts of any exogenous changes, i.e., injections to the system, can be traced through the changes in the endogenous accounts. Each column of $(\mathbf{I}-\mathbf{A}_e)^{-1}$ shows the global effects of all endogenous activity levels induced by an exogenous unit inflow accruing to the corresponding account, after allowing for all interdependent feedbacks to run their course through a process of multiplier effects.

Table 4 A Simplified Framework of SAM Multiplier Model

		Expenditures		Total
		Endogenous ccounts	Exogenous Accounts	
Receipts	Endogenous Accounts	$\mathbf{E}=\mathbf{A}_e\hat{\mathbf{y}}_e$	$\mathbf{X}$	$\mathbf{y}_e=\mathbf{e}+\mathbf{x}=\mathbf{A}_e\mathbf{y}_e+\mathbf{x}$
	Exogenous Accounts	$\mathbf{L}=\mathbf{A}_l\hat{\mathbf{y}}_e$	$\mathbf{R}$	$\mathbf{y}_e=\mathbf{l}+\mathbf{r}=\mathbf{A}_l\mathbf{y}_e+\mathbf{r}$
Total		$\mathbf{y}'_e$	$\mathbf{y}'_x$	

Notes: 1. The notations written in capital letters refer to matrices, while the ones in small letters refer to the row / column sum vectors of corresponding matrices. A hat indicates a diagonal matrix. A dash indicates a row vector.

2. **E**: matrix of transactions among endogenous accounts;
L: matrix of leakages from endogenous accounts to exogenous accounts;
X: matrix of injections from exogenous accounts into endogenous accounts;
R: matrix of transactions among exogenous accounts.
$\mathbf{A}_e$: matrix of endogenous average expenditure propensities;
$\mathbf{A}_l$: matrix of average expenditure propensities to leak.

4.2 From Real SAM Multipliers to F-SAM Multipliers

In order to analyze the real-financial linkage of Chinese economy, we calculate the matrix of real SAM multipliers, followed by the matrix of F-SAM multipliers. Through the comparison of two

matrices, we intend to identify: (1) whether there are significant multipliers in the intersection of financial variables and real variables. Clearly, the significant multipliers may suggest the existence of real-financial linkage; (2) whether the incorporation of financial flows into the framework results in larger multiplier effects which suggest the role played by financial system; (3) whether the impacts of capital transfer from government sector to non-financial enterprises are preferable in comparison to the transfer from government to households.

Regarding the real SAM analysis, we follow the literature to regard government, rest of the world and aggregated capital account as exogenous accounts whereas all other accounts including production activities, factors and institutions (households and enterprises) as endogenous. The highlights of resulting multiplier matrix are reported in Table 5. Columns S1–S7 show the impacts induced by one unit increase in exports and investment in production activities 1–7 respectively. Column S10 shows the impacts induced by one unit increase in government transfer to households. If we take column S3 as an example, the multipliers in Table 5 can be interpreted in following way. The multipliers in column S3 indicate that one unit increase of exports and investment in light industry would induce an increase of production by 3.53 units in the whole economy, of which 1.62 units in its own sector, 0.60 in heavy industry, and 0.66 in services industry. It also generates 0.60 units in compensation of labor, and 0.76 units in household income.

Table 5 Real SAM Multipliers, China, 2002

		S1	S2	S3	S4	S5	S6	S7	S10
Production Activities									
Agriculture	1	1.46	0.18	0.43	0.17	0.16	0.31	0.24	0.34
Mining & Quarrying	2	0.08	1.11	0.08	0.43	0.13	0.13	0.08	0.07
Light Industry	3	0.43	0.25	1.62	0.24	0.25	0.36	0.38	0.43
Energy Industry	4	0.13	0.17	0.13	1.20	0.15	0.17	0.15	0.11
Heavy Industry	5	0.60	0.53	0.60	0.53	1.98	1.09	0.58	0.48
Construction	6	0.02	0.01	0.01	0.01	0.01	1.02	0.03	0.01
Service	7	0.72	0.55	0.66	0.60	0.56	0.77	1.74	0.75
Sub-total		3.44	2.80	3.53	3.18	3.24	3.85	3.20	2.19
Factors									
Labor	8	0.97	0.54	0.60	0.49	0.45	0.64	0.65	0.45
Capital	9	0.43	0.49	0.45	0.53	0.38	0.47	0.53	0.32
Current Account									
Households	10	1.11	0.71	0.76	0.67	0.58	0.80	0.83	1.56
Non-Financial Enterprises	11	0.19	0.22	0.20	0.24	0.17	0.21	0.24	0.14

Note: Account order refers to Appendix 2.
Source: Author's calculations from F-SAM for China, 2002.

We next turn to the calculation results of F-SAM. In our analysis of F-SAM, following Emini and Fofack (2004), government and rest of the world sectors in both current and capital accounts are defined as exogenous accounts. And besides, we also consider government bonds and foreign reserves among financial instruments as exogenous. Two reasons justifying our partition of accounts are: (1) with respect to the government and rest of the world, policy measures are more or less under the control of the government, while exports and some other transactions are assumed to depend on overseas factors (Thorbecke and Jung 1996: 282); (2) with respect to the government bonds and foreign reserves, the former is solely the liability of government sector, while the latter is solely the liability of the rest of the world sector. Provided that government and rest of the world sectors are exogenous, it carries no weight to keep these two financial variables as endogenous accounts. The highlights of resulting F-SAM multiplier matrix are reported in Table 6.

Similar to the real SAM multipliers, the multipliers in the table present the impacts induced by one unit change in exogenous accounts on corresponding column accounts. Columns S1–S7, here, show the impacts induced by one unit increase in exports and public investment on various production activities. Column S10 shows the impacts induced by one unit increase in government transfer to households, while column S16 shows the impacts induced by one unit increase in government transfer to non-financial enterprises. Again taking column S3 as an example, the multipliers in column S3 indicate that one unit increase in government investment and exports in light industry would induce the increase in production by 5.05 units, of which 1.78 units in its own sector, 1.15 units in heavy industry and 0.97 units in services industry. It would also induce increase in compensation of labor by 0.85 units, household income by 1.07 units. In addition, on the financial side, it would induce household savings by 0.34 units, and various financial flows by 0.63 units, of which 0.29 units in deposits, 0.21 units in loans.

A closer comparison of the multipliers in two matrices suggests that:

First, there are significant multiplier effects between financial variables and other variables, as shown in the rows of financial variables in Table 6. Especially, the relatively large multipliers always appear in the rows of deposits and loans. This implies that financial side and real side of Chinese economy are closely intertwined with each other. In addition, Chinese financial intermediation is featured by indirect finance. One unit increase in exports and public investment in various production activities induce the economy-wide accumulation of financial assets by 0.64 units on average, of which, 0.30 units come from deposits, and 0.22 units come from bank loans

Secondly, F-SAM multipliers are larger than real SAM multipliers everywhere. In case of real SAM multipliers, one unit increase in exports and investment would induce the increase in various production activities by 3.32 units on average, increase in factor incomes by 1.09 units on average, and increase in household income by 0.78 units on average. In case of the F-SAM multipliers, one unit increase in exports and public investment would induce the increase in various production activities

Table 6 F-SAM Multipliers, China, 2002

		S1	S2	S3	S4	S5	S6	S7	S10	S16
Production Activities										
Agriculture	1	1.62	0.31	0.56	0.31	0.27	0.45	0.39	0.51	0.40
Mining & Quarrying	2	0.15	1.17	0.14	0.49	0.17	0.19	0.15	0.14	0.17
Light Industry	3	0.62	0.41	1.78	0.41	0.38	0.53	0.56	0.64	0.48
Energy Industry	4	0.21	0.24	0.19	1.27	0.21	0.24	0.22	0.20	0.20
Heavy Industry	5	1.25	1.09	1.15	1.11	2.43	1.67	1.21	1.21	1.66
Construction	6	0.31	0.26	0.26	0.27	0.21	1.27	0.31	0.34	0.74
Service	7	1.08	0.87	0.97	0.92	0.80	1.09	2.09	1.16	0.92
Sub-total		5.24	4.35	5.05	4.78	4.47	5.44	4.93	4.20	4.57
Factors										
Labor	8	1.26	0.80	0.85	0.75	0.65	0.91	0.94	0.78	0.75
Capital	9	0.65	0.68	0.64	0.73	0.53	0.67	0.74	0.56	0.56
Current Account										
Households	10	1.49	1.03	1.07	1.00	0.83	1.13	1.19	1.97	0.95
Non-Financial Enterprises	11	0.29	0.31	0.29	0.33	0.24	0.30	0.33	0.25	0.25
Financial Institutions	13	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Capital Account										
Households	15	0.47	0.33	0.34	0.32	0.27	0.36	0.38	0.62	0.35
Non-Financial Enterprises	16	0.49	0.45	0.43	0.46	0.35	0.45	0.49	0.51	1.52
Financial Institutions	18	0.49	0.38	0.38	0.37	0.30	0.40	0.43	0.60	0.67
Financial Account										
Currency	20	0.03	0.02	0.02	0.02	0.01	0.02	0.02	0.03	0.02
Deposits	21	0.37	0.29	0.29	0.29	0.23	0.31	0.33	0.46	0.56
Corporate Bonds	23	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
Stocks	24	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01
Loans	25	0.27	0.21	0.21	0.21	0.17	0.22	0.24	0.34	0.37
FDI	26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Other Financial Flows	28	0.12	0.09	0.09	0.09	0.07	0.09	0.10	0.15	0.12

Note: Account order refers to Appendix 2.
Source: Author's calculations from F-SAM for China, 2002.

by 4.90 units on average, increase in factor incomes by 1.54 units on average, and increase in household income by 1.11 units on average. Accordingly, one unit exogenous change induces larger impacts in F-SAM framework than real SAM.

The reason is that, F-SAM multipliers incorporate the induced effects of financial intermediation process which is dropped in real SAM framework. In conventional real SAM framework, the multipliers incorporate: (1) direct effects of changes in a sector's output induced directly by exogenous shocks; (2) indirect effects resulting from various rounds of purchases a sector makes to other industries; (3) induced effects resulting from changes in factor income payments and household

expenditures. In contrast, F-SAM multipliers incorporate, additionally, the effects induced by institutional savings and consequential channeling of these savings to physical investment.

Explicitly, we interpret larger multipliers in F-SAM framework from following two perspectives.

(1) Larger multiplier effects in financial SAM framework suggest the significant role played by money multiplier. Through the money creation process, commercial banking system generates money supply from monetary base. Consequently, an economy with modern financial arrangements can create more savings and investment than an economy without financial arrangements. For the sake of simplicity, assume an economy with only one financial institution, i.e., a commercial bank, savers deposit all their money in the bank. The bank now claims the amount of deposits as its liabilities. The bank then can make loans as long as it retains the reserves determined by the law. This lending of money creates new money since the depositors still have the claims of their money, while the borrowers of loans have money too. The loans can be used by the borrowers for various purposes including consumption and investment. Whichever the case is, the money would be transferred from the buyers to sellers who may deposit the money back to the bank. The bank again makes loans from these newly generated deposits. Provided that the process continues, new money, i.e., new savings and new investment would be created. Therefore, in the economy, although total savings always equal to total investment, both would be enlarged by the money creation process. Furthermore, note this process is absent in a real SAM framework. In this sense, our F-SAM framework reflects the reality more accurately than a real SAM.

(2) Even with the same amount of investment, an economy with financial arrangements might create more output than an economy without financial arrangements. Through screening and monitoring the investment projects, an efficient financial system can allocate the capital to more profitable investment. Consequently, the efficiency of the whole economy improves. Certainly, due to the non-separation of non-financial enterprises, the directions of investment allocation and consequent economic impacts cannot be traced in current Chinese F-SAM. However, possible mechanism can be inferred.

Therefore, the comparison of the multiplier effects in real SAM and F-SAM implies that the development of modern financial system in the transition economies such as China leads to more savings, more investment, efficiency improvement and consequently welfare improvement in the whole economy.

Thirdly, comparing the impacts of government capital transfer to non-financial enterprises and current transfer to households, the former induces, albeit slightly, larger multiplier effects on the whole economy than the latter. However, the current transfer to households induces much larger multiplier effects on household income. Specifically, one unit increase in capital transfer from government to non-financial enterprises induces the increase in economy-wide production by 4.57 units (see column S16 in Table 6). In contrast, one unit increase in current transfer from government

to households induces the increase in economy-wide production by 4.20 units (see column S10 in Table 6). Meanwhile, one unit increase in current transfer from government to households induces 1.97 units of household income (see column S10 in Table 6), while one unit increase in capital transfer from government to non-financial enterprises induces simply induces 0.95 units of household income (see column S16 in Table 6). Therefore, if the Chinese government intends to put policy priority on the increase of household income than production stimulation, transfer to households is obviously more preferable than the transfer to non-financial enterprises.

Finally, it is worthy to note that the discussion here neglects the issue of time span. Obviously, in F-SAM framework, multiplier effects require longer time to be fully exerted than in a real SAM framework. Consider a real SAM framework, the increase in final demand induces the increase in intermediate inputs, it takes more time for income of labor to increase as a result of sales increase. The increase in household expenditures comes after their income increase. While, in F-SAM framework, the mechanism continues when institutions in surplus (mainly, households) hold financial assets. The newly increased financial capital would then be lent to the institutions in deficit (mainly, non-financial enterprises) by financial system for physical investment.

4.3 Waheed and Ezaki-type F-SAM Multipliers: Impact of Savings and Investment[17]

As aforementioned, Waheed and Ezaki-approach stresses on the changes in financial portfolios (both asset-side and liability-side) of each institution. The approach, therefore, allows us to examine how each institution allocates their assets and mobilizes capital in response to the changes in savings and physical investment. In contrast, it is difficult to do so in the above conventional approach in which households, non-financial enterprises and financial institutions in both current and capital accounts are regarded as endogenous accounts. Therefore, at least for these three institutions, it is difficult to capture the changes in their financial portfolios in response to the changes in savings and investment.

In Waheed and Ezaki-approach, capital account and financial account are taken as endogenous accounts, while all other accounts, including activities, factor and current account, are regarded as exogenous accounts. Based on the approach, two types of multiplier analyses, i.e., impact of savings and impact of investment, can be conducted. In terms of the analysis of impact of savings, the model takes exactly the same form as equation (1) presented in sub-section 4.1. $(\mathbf{I}-\mathbf{A}_e)^{-1}$, in this context, captures the impact of exogenous changes in savings on total capital utilization[18] of institutions and financial assets. Meanwhile, in terms of the analysis of impact of investment, the model takes the form as follows.

$$\mathbf{y}'_e=\mathbf{l}'(\mathbf{I}-\mathbf{U})^{-1} \tag{2}$$

A different notation, $\mathbf{U}$ is used here because it is derived by dividing each cell of endogenous accounts by its corresponding row total. $(\mathbf{I}-\mathbf{U})^{-1}$, in this context, captures the impact of exogenous changes in investment on total capital mobilization[19] of institutions and financial assets. Note that

Table 7 Waheed and Ezaki-type F-SAM Multipliers (Due to Changes in Savings), China, 2002

		One unit increase of savings in				
		Households	Non-financial Enterprises	Government	Financial Institutions	Rest of World
Institutions						
Households	15	1.16	0.05	0.08	0.24	0.06
Non-financial Enterprises	16	0.83	1.25	0.78	1.11	1.23
Government	17	0.17	0.04	1.07	0.20	0.08
Financial Institutions	18	1.17	0.39	0.55	1.71	0.57
Rest of World	19	0.26	0.08	0.12	0.36	1.17
Sub-total		3.59	1.81	2.60	3.62	3.11
Changes in Financial Assets						
Currency	20	0.07	0.01	0.01	0.02	0.03
Deposits	21	0.87	0.34	0.46	0.45	0.36
Government Bonds	22	0.12	0.04	0.05	0.16	0.05
Corporate Bonds	23	0.02	0.00	0.00	0.00	0.00
Stocks	24	0.04	0.01	0.01	0.03	0.05
Loans	25	0.63	0.21	0.30	0.93	0.23
FDI	26	0.22	0.08	0.10	0.31	1.01
Foreign Reserves	27	0.20	0.07	0.09	0.29	0.10
Other Financial Flows	28	0.34	0.06	0.11	0.35	0.26
Sub-total		2.51	0.82	1.13	2.54	2.09

Note: Account order refers to Appendix 2.
Source: Author's calculations from F-SAM for China, 2002.

Waheed and Ezaki-approach implies that institutions in the capital accounts demand financial assets in a fixed proportion.

4.3.1 Impact of Savings

Table 7 presents the resulting multiplier matrix for the analysis of impact of savings. The exogenous impact, i.e., one unit increase of savings, is given on each institution listed in columns. Upper part of the table shows the impact on total capital utilization of each institution, whereas the lower part shows the impact on financial portfolio choices (asset-side) of each institution. Table 7 is of interest from following four aspects.

First, the impact of one unit increase in savings of financial institutions is the largest in the economy, i.e., 3.62 units increase in capital utilization of all sectors, and 2.54 units increase in financial flows. Especially, non-financial enterprises (account order: 16) bear the increase by 1.11 units, and on financial instruments, loans (account order: 25) increase by 0.93 units. The facts indicate that financial sector plays central role in resource mobilization and allocation in China. Note that this role used to be played by the government through enforced saving and fiscal appropriation before the 1978-reform.

Secondly, the impact of increase in household savings is the second largest following financial institutions, i.e., 3.59 units increase in capital utilization of all sectors, and 2.51 units increase in financial flows. Financial sector (account order: 18) bears most of the impact by 1.17 units, whereas on financial side, deposits (account order: 21) increase by 0.87 units, and loans (account order: 25) increase by 0.63 units. Financial capital therefore circulates in Chinese economy primarily from households to financial sector in the form of savings deposits, and then from financial sector to non-financial enterprises in the form of bank loans.

Thirdly, in the case of rest of the world, one unit increase in foreign savings considerably contributes to the capital utilization of non-financial enterprises (account order: 16) by 1.23 units, which mainly through the increase in FDI (account order: 26) by 1.01 units. Furthermore, 1.23 units represent the largest impact on capital utilization of non-financial enterprises compared to other economic institutions. That is, FDI exerts large multiplier effects on Chinese economy although its size is modest compared with the bulk of investment financed by domestic savings. The fact suggests that foreign capital is turned into investment more efficiently than domestic financial capital.

Fourthly, with respect to government sector, we find that, despite the large amount of capital transfer, the impact of every one unit increase in government savings on the capital utilization of non-financial enterprises (account order: 16), 0.78 units, does not appear to be high. Hence, the efficiency of government capital transfer, albeit designed for physical investment, is low.

4.3.2 Impact of Investment

Table 8 presents the $\mathbf{(I-U)}^{-1}$ calculated from equation (2). The exogenous impact, i.e., one unit increase of physical investment, is given on each institution listed in rows. Left part of the table shows the impact on total capital mobilization of each institution, whereas the right part shows the impact on financial portfolio choices (liability-side) of each institution. Notice that rest of the world is not included in the rows of the table because foreign sector does not accumulate physical capital by definition in our framework. Table 8 is of interest from following three aspects.

First, same as the discussion of savings impact, financial institutions again exert largest impact in the economy, i.e., 3.31 units on the capital mobilization of all institutions, and 2.26 units on total financial flows. The finding confirms again that financial sector plays central role in resource mobilization and allocation in China.

Secondly, in contrast to households and government sector, one unit increase in the physical investment of non-financial enterprises: (1) gives larger impact on economy-wide capital mobilization, i.e., 3.00 units; (2) rely more on financial instruments for capital mobilization (mainly through bank loans), i.e., 1.86 units. Note that the multiplier, 1.25 units of non-financial enterprises (account order: 16), which is the capital mobilization of non-financial enterprises induced by one unit increase in the investment of its own sector, is higher than that of households (account order: 15), 1.16 units, and

Table 8 Waheed and Ezaki-type F-SAM Multipliers (Due to Changes in Investment), China, 2002

	Institutions						Changes in Financial Liabilities									
	15	16	17	18	19	Sub-total	20	21	22	23	24	25	26	27	28	Sub-total
One unit increase of investment in																
Households	1.16	0.09	0.04	0.33	0.01	1.63	0.01	0.25	0.01	0.00	0.00	0.25	0.01	0.01	0.06	0.60
Non-financial Enterprises	0.49	1.25	0.23	0.90	0.13	3.00	0.04	0.70	0.07	0.01	0.03	0.51	0.12	0.17	0.21	1.86
Government	0.33	0.14	1.07	0.54	0.03	2.11	0.02	0.42	0.30	0.00	0.00	0.12	0.01	0.04	0.18	1.09
Financial Institutions	0.85	0.48	0.20	1.71	0.07	3.31	0.07	1.32	0.06	0.00	0.01	0.32	0.05	0.10	0.33	2.26

Note: Account order refers to Appendix 2.
Source: Author's calculations from F-SAM for China, 2002.

government (account order: 17), 1.07 units. However, this does not necessarily mean that non-financial enterprises rely more on internal finance than external finance. Taken relative values as concerned, 1.16 units of households indicate that 71.17 percent (1.16/1.63) of impact among total is on its own sector; 1.25 units of non-financial enterprises indicate that 41.67 percent (1.25/3.00) of impact among total goes to the capital mobilization of own sector; 1.07 units of government indicate that 50.71 percent (1.07/2.11) of impact among total is on the capital mobilization of its own. Therefore, non-financial enterprises rely more on external finance compared to households and government,. Especially, in the case of household sector, the impacts induced by one unit increase of physical investment by households on other sectors are trivial, i.e., 0.09 units of non-financial enterprises (account order: 16), 0.04 units of government (account order: 17), and 0.33 units of financial institutions (account order: 18). The low impact on financial institutions may suggest the underdevelopment of consumer credit.

Thirdly, increase of the public investment mainly gives the impact on household sector (account order: 15) of 0.33 units, and financial sector (account order: 18) of 0.54 units, i.e., two main buyers of the government bonds. On the financial side, significant multiplier, 0.30 units, is observed for the government bonds (account order: 22). Accordingly, government sector mobilizes the capital from households and financial sector mainly through the issuance of government bonds.

5. Concluding Remarks

The F-SAM constructed in current study made it possible to closely examine the structural characteristics of Chinese economy from the perspective of flows of funds. The main findings from multiplier analyses are summarized as follows. First, real side and financial side of Chinese economy

are closely intertwined with each other. Secondly, the development of a modern financial system contributes to the growth of Chinese economy. Thirdly, financial sector, in place of government, has come to play a central role in resource mobilization and allocation, although government maintains interventions through capital transfer to non-financial enterprises. Fourthly, bank deposits and loans are single significant financial instruments in China's resources mobilization and allocation processes. In addition, some minor findings from multiplier analyses indicate that, first, FDI significantly contributes to the capital formation in China, while government capital transfer's role is rather moderate; secondly, government sector mainly relies on bond issuance for its finance in China.

It is worthy to note that the current study is a static study for year 2002. Since then, Chinese financial system has undergone a series of reforms. Banking sector, focus of recent reforms, has improved its lending practices to a certain extent. However, indirect finance still dominates the financial intermediation process in China. With the next step of financial reform in capital market, the role played by financial system in Chinese economy is expected to become more significant in the future.

Note

1 A comparison of savings, investment and financial intermediation in centrally planned economy and market economy is summarized as follows (cf. Wei: 1999: 80, Saunders and Walters: 1991: 101–118).

	Centrally Planned Economies	Market-oriented Economies
Investment System	Investment undertaken only by state Sector	Investment undertaken mainly by private sector
Investment Finance	Mainly internal finance by budget grants and retained earnings	Combination of internal and external finance by self-owned funds, bank credits, bonds, stocks
Savings Structure	Mainly government savings and enterprises savings; (enforced household savings)	Mainly household savings
Financial Intermediation	Less important and underdeveloped	Important and highly developed

2 Note that "enterprise sector" consisted of only state-owned enterprises before the 1978-reform.

3 In Table 2, both financial savings (assets of non-financial economic entities while liabilities of financial institutions) and lending (assets of financial institutions while liabilities of non-financial economic entities) are regarded as financial assets. Consequently, double accounting casts the doubt on validity of the method. However, this does not sway our conclusion from the table that there is remarkable improvement in the diversification of financial assets in China since 1978. If we are interested in the process of financial deepening, we can simply use M2-to-GDP ratio. It increased monotonously in the reform period, from 31.8 percent in 1978 to 163.2 percent in 2005.

4 Respectively, Keynesian consumption/saving and permanent income models were tested in Qian (1988); life-cycle model was tested in Jefferson (1990), Modigliani and Cao (1996); life-cycle and permanent income models were tested in Wang (1995). After examining the measurement of Chinese savings closely, Kraay (2000) offered the empirical tests on the importance of expectations of future income growth and future income uncertainty.

5 The five detailed tables, 1998–2002, are available in *Data of Flow-of-Funds of China,* 1998–2002, published in 2005.

6 Flow-of-funds framework was firstly presented by Copeland (1952). It was included in the System of National Accounts in 1968.

7 The model was proposed first in 1983, and modified in 2003.

8 A traditional SAM, in its simplistic format, includes production activities, factors of production, current accounts of institutions and an aggregated capital account. This type of SAM is called real SAM since it does not illustrate the financial side of the economy, explicitly, financial flows. Note that "an aggregated capital account" means that the account is a single entry for the whole economy. Savings of institutions go to investment, and there is no account for the participation of each one of institutions in the gross capital formation.

9 In Blancas (2006), flow-of-funds was included in F-SAM as net financial flows among institutions of capital account, while in Robinson (1991)'s approach, flow-of-funds was included in F-SAM as changes in the financial assets and liabilities of a newly-added financial account.

10 In contrast, there is also investment in financial capital, i.e., acquisition of financial assets (financial claims such as various kinds of securities). Note the right-hand side of the identity is also called net financial investment in flow-of-funds framework.

11 Detailed data sources to construct the F-SAM and the entries of cells by accounts are available upon request.

12 In this study, capital utilization refers to the changes in the asset-side of an institution's balance sheet; capital mobilization refers to the changes in the liability-side of an institution's balance sheet.

13 According to the definition in National Bureau of Statistics of China (2003: 63), capital transfer refers to the payment of funds from one institution to another for non-financial investment. The transfer is free and does not require any returns from the recipients. Capital transfer differs from the current transfer in two perspectives. First, the transfer is used for investment, rather than consumption. Secondly, the transfer consists of investment allowances and other capital transfer. The transfer includes the transfer of ownership through acquisition of assets. Note that in 2002, there was no capital transfer from government to financial institutions, while from 1992 to 2001, there was capital transfers to financial institutions as well. However, it is unlikely that the funds used to recapitalize the state-owned banks are recorded in the flow-of-funds statistics as capital transfers to financial institutions. Furthermore, albeit unclear yet, since the sources of funds to recapitalize the state-owned banks are diverse, the treatment of those funds might be diverse in flow-of-funds statistics as well. Up to now, the recapitalization of state-owned banks in China happened in 1998, 2003 and 2004. In 1998, the capital injection of RMB 270 billion to recapitalize the four big state-owned banks was mobilized through issuing special government bonds. In 2003, the capital injection of USD 45 billion to recapitalize the Bank of China and China Construction Bank was from foreign reserves. In 2004, the capital injection of USD 15 billion to recapitalize the Industrial and Commercial Bank of China was also from foreign reserves, while the capital injection to recapitalize the Bank of Communications includes RMB 5 billion from Ministry of Finance, RMB 3 billion from Central Huijin Company and RMB 10 billion from State Social Security Funds. However, the sources of capital from Ministry of Finance and Central Huijin Company have not been clearly declared.

14 The statistics of subsidies to state-owned enterprises are available in *China Statistical Yearbook*. In 2002, the subsidies amounted to RMB 26.0 billion, while in the same year, capital transfer from the government to non-financial enterprises amounted to RMB 563.4 billion.

15 According to Nakamura (1998), the same feature can be found in another transition economy, Russia as well. With respect to Russia, he argued that the capital transfer may be related to privatization because the changes of ownership through voucher privatization are treated as capital transfer in the Russian national accounts.

16 There is a superior approach which calculates the inverse matrix from marginal expenditure propensities, i.e., fixed price multiplier (see Pyatt and Round: 1979). However, due to the data limitations, accounting multipliers calculated from average expenditure propensities are still used in many empirical studies.

17 Waheed and Ezaki-type model is highly comparable with Klein (1983 and 2003) in the attempt to measure the impacts of increase in physical investment on financial portfolio decisions of institutions. In this sense, even

though Waheed and Ezaki (2007)-model is built up on F-SAM framework instead of flow-of-funds framework used in Klein (1983 and 2003), it is essentially a flow-of-funds model. For the details, c.f. Waheed and Ezaki (2007).

18 In Waheed and Ezaki (2007), the term, "resource availability", is used. We use a different term to maintain the consistency of discussions in our study.

19 In Waheed and Ezaki (2007), the term, "resource requirement", is used. We changed the term for the same reason as stated in endnote 18.

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Appendix 1　A Schematic Financial SAM

→ Expenditures / ↓ Receipts		Production Activities	Factors		Current Account of Institutions					Capital Account of Institutions					Financial Account	Total
		1–7	8	9	10	11	12	13	14	15	16	17	18	19	20–28	29
Production Activities	1–7	IMD			CON_h		CON_g		EXP	INV_h	INV_{nf}	INV_g	INV_f			Total Demand
Labor	8	CML							REM							Total
Capital	9	CMK							KIF							Value-added
Households	10		WA_h	RK_h		TR_{hnf}	TR_{hg}									
Non-financial Enterprises	11			RK_{nf}					TR_{nfw}							
Government	12	TOP		RK_g	TR_{gh}	TR_{gnf}		TR_{gf}	TR_{gw}							Income of Institutions
Financial Institutions	13			RK_f												
Rest of World	14	IMP	WA_w	RK_w			TR_{wg}									
Households	15				SAV_h										FL_h	
Non-financial Enterprises	16					SAV_{nf}						KTR_{nfg}			FL_{nf}	Change in Total
Government	17						SAV_g								FL_g	Liabilities of
Financial Institutions	18							SAV_f							FL_f	Institutions
Rest of World	19								SAV_w						FL_w	
Financial Flows	20–28									FA_h	FA_{nf}	FA_g	FA_f	FA_w		Total Financial Flows
Total	29	Total Supply	Factors Outlay		Expenditures of Institutions					Changes in Total Assets of Institutions					Total Financial Flows	

Note: The description of the subscripts and notations in the table is as follows. h: households; nf: non-financial enterprises; g: government; f: financial institutions; w: rest of the world. IMD: intermediate inputs; CON: consumption; EXP: exports; INV: investment, i.e., total capital formation which consists of gross fixed capital formation and increase in inventory; CML: labor income from domestic production activities; REM: labor income from abroad; CMK: capital income from domestic production activities; KIF: capital income from abroad; WA: labor income to institutions; RK: capital income to institutions; TR_{hnf}: current transfer from non-financial enterprises to households; TR_{hg}: current transfer from government to households; TR_{nfw}: current transfer from rest of the world to non-financial enterprises; TOP: taxes on production, i.e., indirect taxes; TR_{gh}: current transfer from households to government, which consists of income taxes and payment to social security system; TR_{gnf}: corporate taxes paid by non-financial enterprises; TR_{gf}: corporate taxes paid by financial institutions; TR_{gw}: current transfer from rest of the world to government; IMP: imports; TR_{gw}: current transfer from government to rest of the world; SAV: savings; KTR_{nfg}: capital transfer from government to non-financial enterprises; FL: changes in financial liabilities; FA: changes in financial assets.

Appendix 2 F-SAM for China, 2002 (Unit: bn. Yuan)

			Production Activities							Factors		Current Account of Institutions		
			1	2	3	4	5	6	7	8	9	10	11	12
Production Activities	Agriculture	1	463.7	4.0	715.3	0.7	68.2	228.6	153.4			1046.4		16.4
	Mining & Quarrying	2	9.8	35.2	19.8	510.4	375.8	70.3	37.8			28.5		
	Light Industry	3	175.5	15.2	1224.9	8.4	281.0	120.6	678.9			1173.1		
	Energy Industry	4	61.2	93.5	89.1	122.1	486.5	113.2	406.6			156.6		
	Heavy Industry	5	252.8	157.3	482.7	130.6	4571.9	1139.8	1059.7			535.3		
	Construction	6	5.0	1.4	2.1	1.0	5.0	3.4	166.4			0.0		
	Service	7	226.9	128.4	544.2	182.8	1134.4	477.9	1913.8			2317.1		1895.6
Fact-ors	Labor	8	1331.6	257.0	482.9	132.4	989.7	389.9	2311.6					
	Capital	9	277.0	274.6	528.5	283.9	905.3	241.1	2034.3					
Current Account	Households	10								5892.8	1571.2		6.9	448.9
	Non-Financial Enterprises	11									2075.1			
	Government	12	54.5	65.1	311.2	120.4	499.7	28.5	666.9		689.6	526.0	241.3	
	Financial Institutions	13									87.4			
	Rest of World	14	68.1	166.9	304.5	53.1	1903.5	8.0	190.1	7.9	184.7			1.3
Current Account	Households	15										2136.6		
	Non-Financial Enterprises	16											1843.8	
	Government	17												859.2
	Financial Institutions	18												
	Rest of World	19												
Financial Account	Currency	20												
	Deposits	21												
	Government Bonds	22												
	Corporate Bonds	23												
	Stocks	24												
	Loans	25												
	FDI	26												
	Foreign Reserves	27												
	Other Financial Flows	28												
Total		29	2926.0	1198.6	4705.3	1545.8	11221.0	2821.2	9619.4	5900.6	4608.1	7919.7	2092.0	3221.4

of Institutions		Capital Account of Institutions					Financial Account									Total
13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
	47.4	26.5	136.0	18.6	0.8											2926.0
	44.8	9.6	49.4	6.7												1198.3
	846.9	26.3	135.2	18.4	0.8											4705.3
	846.9	−2.1	−10.9	−1.5	0.1											1545.9
	1456.6	208.8	1072.5	146.3	6.7											11221.0
	10.5	382.3	1964.1	268.0	12.2											2821.2
	656.8	20.6	105.8	14.4	0.7											9619.4
	5.6															5900.6
	63.4															4608.1
																7919.7
	16.9															2092.0
17.6	0.7															3221.4
																87.4
																2888.2
												507.4				2644.0
				563.4						32.5	96.2	1448.6	408.1		79.3	4471.9
									372.7			6.7			100.3	1338.8
69.8							158.9	2791.2				−15.7			629.3	3633.6
	−292.8						0.0	19.3				44.6	20.8	625.0	61.7	478.5
		131.9	14.3	3.2		9.5										158.9
		1425.2	1073.8	289.8	19.3	2.4										2810.4
		46.3		1.4	325.0											372.7
		41.6			−9.1											32.5
		63.6			14.0	18.6										96.2
			0.0		2025.9	−34.3										1991.7
			20.8			408.1										429.0
					625.0											625.0
		263.5	−89.2	10.0	612.1	74.2										870.6
87.4	2888.2	2644.0	4471.9	1338.8	3633.4	478.5	158.9	2810.4	372.7	32.5	96.2	1991.7	429.0	625.0	870.6	

Source: Author's construction.